Claims:

1. A storage medium for data comprising a plurality of layers comprising:

a) a substrate layer comprising a polymer; and

b) at least one data layer on the substrate;

wherein the polymer at a predetermined maximum tilt range for the storage medium has a water strain determined by the following equation (I):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r.}$$

wherein t is substrate thickness; r is a predetermined radius of the storage medium; and Δrh is change in relative humidity.

2. The storage medium in accordance with claim 1, wherein the radius is 53 millimeters.

3. The storage medium in accordance with claim 1, wherein the change in relative humidity is 40% at 25°C.

4. The storage medium in accordance with claim 1, wherein the polymer comprises a thermoplastic or a thermoset.

5. The storage medium in accordance with claim 4, wherein the polymer comprises at least one thermoplastic.

6. The storage medium in accordance with claim 5, wherein the thermoplastic is selected from the group consisting of polyesters, polycarbonates, polystyrenes, polymethylmethacrylates, polyketones, polyamides, aromatic polyethers such as polyether sulfones and polyether imides, polyether ketones, polyetherether ketones, polyphenylene ether, polyphenylene sulfides, and combinations thereof.

7. The storage medium in accordance with claim 6, wherein the thermoplastic comprises a polycarbonate.

8. The storage medium in accordance with claim 1, wherein the substrate thickness is in a range between about 0.4 millimeters and about 2.5 millimeters.

9. The storage medium in accordance with claim 8, wherein the substrate thickness is 1.2 millimeters.

10. The storage medium in accordance with claim 9, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.06%.

11. The storage medium in accordance with claim 9, wherein the maximum tilt range is 0.8 degrees and the maximum water strain is less than 0.04%.

12. The storage medium in accordance with claim 9, wherein the maximum tilt range is 0.3 degrees and the maximum water strain is less than 0.015%.

13. The storage medium in accordance with claim 8, wherein the substrate thickness is 0.6 millimeters.

14. The storage medium in accordance with claim 13, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.03%.

15. The storage medium in accordance with claim 13, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.02%.

16. The storage medium in accordance with claim 13, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.0008%.

17. A storage medium for data comprising a plurality of layers comprising:

a) a substrate layer comprising a polycarbonate; and

b) at least one data layer on the substrate;

wherein the polycarbonate at a maximum tilt range of 1.2 degrees has a water strain determined by the following equation (I):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r.}$$

wherein t is 1.2 millimeters; r is a 53 millimeters; and Δrh is 40% at 25°C.

18. A storage medium for data comprising a plurality of layers comprising:

a) a substrate layer comprising a polycarbonate; and

b) at least one data layer on the substrate;

wherein the polycarbonate at a maximum tilt range of 1.2 degrees has a water strain determined by the following equation (I):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r.}$$

wherein t is 0.6 millimeters; r is a 53 millimeters; and Δrh is 40% at 25°C.

19. A storage medium for data comprising a plurality of layers comprising:

a) at least one substrate layer comprising a polymer,

b) at least one data layer on the substrate; and

c) at least one thin film layer on the data layer wherein the thin film layer comprises a material with substantially the same physical properties as the polymer; and

wherein the polymer at a predetermined maximum tilt range for the storage medium has a water strain determined by the following equation (II):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r(11.474\rho^2 - 6.6\rho + 0.99)}$$

wherein t is substrate thickness; ρ is a predetermined thickness ratio of the thickness of the thin film layer to the thickness of the substrate layer; r is a predetermined radius of the storage medium; and Δrh is change in relative humidity.

20. The storage medium in accordance with claim 19, wherein the radius is 53 millimeters.

21. The storage medium in accordance with claim 19, wherein the thickness ratio is 0.068 and the substrate thickness is 1.1 millimeters.

22. The storage medium in accordance with claim 21, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.095%.

23. The storage medium in accordance with claim 21, wherein the maximum tilt range is 0.8 degrees and the maximum water strain is less than 0.064%

24. The storage medium in accordance with claim 21, wherein the maximum tilt range is 0.3 degrees and the maximum water strain is less than 0.024%.

25. The storage medium in accordance with claim 19, wherein the thickness ratio is 0.091 and the substrate thickness is 1.1 millimeters.

26. The storage medium in accordance with claim 25, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.117%.

27. The storage medium in accordance with claim 25, wherein the maximum tilt range is 0.8 degrees and the maximum water strain is less than 0.078%.

28. The storage medium in accordance with claim 25, wherein the maximum tilt range is 0.3 degrees and the maximum water strain is less than 0.029%.

29. The storage medium in accordance with claim 19, wherein the change in relative humidity is 40% at 25°C.

30. The storage medium in accordance with claim 19, wherein the polymer comprises a thermoplastic or a thermoset.

31. The storage medium in accordance with claim 30, wherein the polymer comprises at least one thermoplastic.

32. The storage medium in accordance with claim 31, wherein the thermoplastic is selected from the group consisting of polyesters, polycarbonates, polystyrenes, polymethylmethacrylates, polyketones, polyamides, aromatic polyethers such as polyether sulfones and polyether imides, polyether ketones, polyetherether ketones, polyphenylene ether, polyphenylene sulfides, and combinations thereof.

33. The storage medium in accordance with claim 32, wherein the thermoplastic comprises a polycarbonate.

34. The storage medium in accordance with claim 19, wherein the thin film layer has a thickness in a range between about 5% and about 25% of the substrate thickness.

35. The storage medium in accordance with claim 34, wherein the thin film layer has a thickness in a range between about 10% and about 20% of the substrate thickness.

36. A storage medium for data comprising a plurality of layers comprising:

a) at least one substrate layer comprising a polycarbonate,

b) at least one data layer on the substrate; and

c) at least one thin film layer on the data layer wherein the thin film layer comprises a material with substantially the same physical properties as the polycarbonate; and

wherein the polycarbonate at a maximum tilt range of 1.2 degrees has a water strain determined by the following equation (II):

$$\text{Water Strain } (\%) < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r(11.474\rho^2 - 6.6\rho + 0.99)}$$

wherein t is 1.1 millimeters; ρ is 0.068; r is 53 millimeters; and Δrh is 40% at 25°C.

37. A storage medium for data comprising a plurality of layers comprising:

a) at least one substrate layer comprising a polycarbonate,

b) at least one data layer on the substrate; and

c) at least one thin film layer on the data layer wherein the thin film layer comprises a material with substantially the same physical properties as the polycarbonate; and

wherein the polycarbonate at a maximum tilt range of 1.2 degrees has a water strain determined by the following equation (II):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r(11.474\rho^2 - 6.6\rho + 0.99)}$$

wherein t is 1.1 millimeters; ρ is 0.091; r is 53 millimeters; and Δrh is 40% at 25°C.

38. A method for determining the water strain of a multilayer article with water absorption from one side, the method comprising predetermining a maximum tilt range and radius for the article; and

calculating the water strain using the following equation (I):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r.}$$

wherein t is article thickness; r is the predetermined radius of the article; and Δrh is change in relative humidity.

39. The method in accordance with claim 38, wherein the article comprises a storage medium for data.

40. The method in accordance with claim 39, wherein the storage medium for data comprises:

a) a substrate layer comprising a polymer; and

b) at least one data layer.

41. The method in accordance with claim 40, wherein the radius is 53 millimeters.

42. The method in accordance with claim 38, wherein the change in relative humidity is 40% at 25°C.

43. The method in accordance with claim 40, wherein the polymer comprises a thermoplastic or a thermoset.

44. The method in accordance with claim 43, wherein the polymer comprises at least one thermoplastic.

45. The method in accordance with claim 44, wherein the thermoplastic is selected from the group consisting of polyesters, polycarbonates, polystyrenes, polymethylmethacrylates, polyketones, polyamides, aromatic polyethers such as polyether sulfones and polyether imides, polyether ketones, polyetherether ketones, polyphenylene ether, polyphenylene sulfides, and combinations thereof.

46. The method in accordance with claim 45, wherein the thermoplastic comprises a polycarbonate.

47. The method in accordance with claim 40, wherein the substrate thickness is in a range between about 0.4 millimeters and about 2.5 millimeters.

48. The method in accordance with claim 47, wherein the substrate thickness is 1.2 millimeters.

49. The method in accordance with claim 48, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.06%.

50. The method in accordance with claim 48, wherein the maximum tilt range is 0.8 degrees and the maximum water strain is less than 0.04%.

51. The method in accordance with claim 48, wherein the maximum tilt range is 0.3 degrees and the maximum water strain is less than 0.015%.

52. The method in accordance with claim 47, wherein the substrate thickness is 0.6 millimeters.

53. The method in accordance with claim 52, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.03%.

54. The method in accordance with claim 52, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.02%.

55. The method in accordance with claim 52, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.0008%.

56. A method for determining the water strain of a storage medium for data wherein the storage medium comprises

a) a substrate layer comprising the polymer; and

b) at least one data layer;

the method comprising calculating the water strain using the following equation (I):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r.}$$

wherein maximum tilt range is 1.2 degrees; t is 1.2 millimeters; r is 53 millimeters; and Δrh is 40% at 25°C.

57. A method for determining the water strain of a storage medium for data wherein the storage medium comprises

a) a substrate layer comprising the polymer; and

b) at least one data layer;

the method comprising calculating the water strain using the following equation (I):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r.}$$

wherein maximum tilt range is 1.2 degrees; t is 0.6 millimeters; r is 53 millimeters; and Δrh is 40% at 25°C.

58. A method for determining the water strain of a multilayer article with water absorption from more than one side, the method comprising predetermining a maximum tilt range and radius for the article; and

calculating the water strain using the following equation (II):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r(1.474\rho^2 - 6.6\rho + 0.99)}$$

wherein t substrate thickness; ρ is a predetermined thickness ratio of the thickness of the thin film layer to the thickness of the substrate layer; r is a predetermined radius of the storage medium; and Δrh is change in relative humidity.

59. The method in accordance with claim 58, wherein the article comprises a storage medium for data.

60. The method in accordance with claim 59, wherein the storage medium for data comprises:

a) at least one substrate layer comprising a polymer;

b) at least one data layer on the substrate; and

c) at least one thin film layer on the data layer wherein the thin film layer comprises a material with substantially the same physical properties as the polymer.

61. The method in accordance with claim 60, wherein the radius is 53 millimeters.

62. The method in accordance with claim 60, wherein the thickness ratio is 0.068 and the substrate thickness is 1.1 millimeters.

63. The method in accordance with claim 62, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.095%.

64. The method in accordance with claim 62, wherein the maximum tilt range is 0.8 degrees and the maximum water strain is less than 0.064%.

65. The method in accordance with claim 62, wherein the maximum tilt range is 0.3 degrees and the maximum water strain is less than 0.024%.

66. The method in accordance with claim 60, wherein the thickness ratio is 0.091 and the substrate thickness is 1.1 millimeters.

67. The method in accordance with claim 66, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.117%.

68. The method in accordance with claim 66, wherein the maximum tilt range is 0.8 degrees and the maximum water strain is less than 0.078%.

69. The method in accordance with claim 66, wherein the maximum tilt range is 0.3 degrees and the maximum water strain is less than 0.029%.

70. The method in accordance with claim 58, wherein the change in relative humidity is 40% at 25°C.

71. The method in accordance with claim 60, wherein the polymer comprises a thermoplastic or a thermoset.

72. The method in accordance with claim 71, wherein the polymer comprises at least one thermoplastic.

73. The method in accordance with claim 72, wherein the thermoplastic is selected from the group consisting of polyesters, polycarbonates, polystyrenes, polymethylmethacrylates, polyketones, polyamides, aromatic polyethers such as polyether sulfones and polyether imides, polyether ketones, polyetherether ketones, polyphenylene ether, polyphenylene sulfides, and combinations thereof.

74. The method in accordance with claim 73, wherein the thermoplastic comprises a polycarbonate.

75. The method in accordance with claim 58, wherein the thin film layer has a thickness in a range between about 5% and about 25% of the substrate thickness.

76. The method in accordance with claim 75, wherein the thin film layer has a thickness in a range between about 10% and about 20% of the substrate thickness.

77. A method for determining the water strain of a storage medium for data, wherein the storage medium for data comprises:

a) at least one substrate layer comprising a polycarbonate;

b) at least one data layer on the substrate; and

c) at least one thin film layer on the data layer wherein the thin film layer comprises a material with substantially the same physical properties as the polycarbonate;

the method comprising calculating the water strain using the following equation (III):

$$\text{Water Strain } (\%) < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r(11.474\rho^2 - 6.6\rho + 0.99)}$$

wherein maximum tilt range is 1.2 degrees; t is 1.1 millimeters; ρ is 0.068; r is 53 millimeters; and Δrh is 40% at 25°C.

78. A method for determining the water strain of a storage medium for data, wherein the storage medium for data comprises:

b) at least one substrate layer comprising a polycarbonate;

b) at least one data layer on the substrate; and

c) at least one thin film layer on the data layer wherein the thin film layer comprises a material with substantially the same physical properties as the polycarbonate;

the method comprising calculating the water strain using the following equation (II):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r(11.474\rho^2 - 6.6\rho + 0.99)}$$

wherein maximum tilt range is 1.2 degrees; t is 1.1 millimeters; ρ is 0.091; r is 53 millimeters; and Δrh is 40% at 25°C.

79. A polymer for the use in a storage medium for data wherein the storage medium comprises

a) a substrate layer comprising the polymer; and

b) at least one data layer;

wherein the polymer at a predetermined maximum tilt range for the storage medium has a water strain determined by the following equation (I):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r.}$$

wherein t is substrate thickness; r is a predetermined radius of the storage medium; and Δrh is change in relative humidity.

80. The polymer in accordance with claim 79, wherein the radius of the storage medium is 53 millimeters.

81. The polymer in accordance with claim 79, wherein the change in relative humidity is 40% at 25°C.

82. The polymer in accordance with claim 79, which comprises a thermoplastic or a thermoset.

83. The polymer in accordance with claim 82, which comprises at least one thermoplastic.

84. The polymer in accordance with claim 83, wherein the thermoplastic is selected from the group consisting of polyesters, polycarbonates, polystyrenes, polymethylmethacrylates, polyketones, polyamides, aromatic polyethers such as polyether sulfones and polyether imides, polyether ketones, polyetherether ketones, polyphenylene ether, polyphenylene sulfides, and combinations thereof.

85. The polymer in accordance with claim 84, wherein the thermoplastic comprises a polycarbonate.

86. The polymer in accordance with claim 79, wherein the substrate thickness is in a range between about 0.4 millimeters and about 2.5 millimeters.

87. The polymer in accordance with claim 86, wherein the substrate thickness is 1.2 millimeters.

88. The polymer in accordance with claim 87, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.06%.

89. The polymer in accordance with claim 87, wherein the maximum tilt range is 0.8 degrees and the maximum water strain is less than 0.04%.

90. The polymer in accordance with claim 87, wherein the maximum tilt range is 0.3 degrees and the maximum water strain is less than 0.015%.

91. The polymer in accordance with claim 86, wherein the substrate thickness is 0.6 millimeters.

92. The polymer in accordance with claim 91, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.03%.

93. The polymer in accordance with claim 91, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.02%.

94. The polymer in accordance with claim 91, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.0008%.

95. A polycarbonate for the use in a storage medium for data wherein the storage medium comprises

a) a substrate layer comprising the polycarbonate; and

b) at least one data layer;

wherein the polycarbonate at a maximum tilt range of 1.2 degrees has a water strain determined by the following equation (I):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r.}$$

wherein t is 1.2 millimeters; r is a 53 millimeters; and Δrh is 40% at 25°C.

96. A polycarbonate for the use in a storage medium for data wherein the storage medium comprises

a) a substrate layer comprising the polycarbonate; and

b) at least one data layer;

wherein the polycarbonate at a maximum tilt range of 1.2 degrees has a water strain determined by the following equation (I):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r.}$$

wherein t is 0.6 millimeters; r is a 53 millimeters; and Δrh is 40% at 25°C.

97. A polymer for the use in a storage medium for data wherein the storage medium comprises

a) at least one substrate layer comprising the polymer,

b) at least one data layer on the substrate; and

c) at least one thin film layer on the data layer wherein the thin film layer comprises a material with substantially the same physical properties as the polymer; and

wherein the polymer at a predetermined maximum tilt range for the storage medium has a water strain determined by the following equation (II):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r(11.474\rho^2 - 6.6\rho + 0.99)}$$

wherein t is substrate thickness; ρ is a predetermined thickness ratio of the thickness of the thin film layer to the thickness of the substrate layer; r is a predetermined radius of the storage medium; and Δrh is change in relative humidity.

98. The polymer in accordance with claim 97, wherein the storage medium radius is 53 millimeters.

99. The polymer in accordance with claim 97, wherein the thickness ratio is 0.068 and the substrate thickness is 1.1 millimeters.

100. The polymer in accordance with claim 99, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.095%.

101. The polymer in accordance with claim 99, wherein the maximum tilt range is 0.8 degrees and the maximum water strain is less than 0.064%.

102. The polymer in accordance with claim 99, wherein the maximum tilt range is 0.3 degrees and the maximum water strain is less than 0.024%.

103. The polymer in accordance with claim 97, wherein the thickness ratio is 0.091 and the substrate thickness is 1.1 millimeters.

104. The polymer in accordance with claim 103, wherein the maximum tilt range is 1.2 degrees and the maximum water strain is less than 0.117%.

105. The polymer in accordance with claim 103, wherein the maximum tilt range is 0.8 degrees and the maximum water strain is less than 0.078%.

106. The polymer in accordance with claim 103, wherein the maximum tilt range is 0.3 degrees and the maximum water strain is less than 0.029%.

107. The polymer in accordance with claim 97, wherein the change in relative humidity is 40% at 25°C.

108. The polymer in accordance with claim 97, which comprises a thermoplastic or a thermoset.

109. The polymer in accordance with claim 108, which comprises at least one thermoplastic.

110. The polymer in accordance with claim 109, wherein the thermoplastic is selected from the group consisting of polyesters, polycarbonates, polystyrenes, polymethylmethacrylates, polyketones, polyamides, aromatic polyethers such as polyether sulfones and polyether imides, polyether ketones, polyetherether ketones, polyphenylene ether, polyphenylene sulfides, and combinations thereof.

111. The polymer in accordance with claim 110, wherein the thermoplastic comprises a polycarbonate.

112. The polymer in accordance with claim 97, wherein the thin film layer has a thickness in a range between about 5% and about 25% of the substrate thickness.

113. The polymer in accordance with claim 112, wherein the thin film layer has a thickness in a range between about 10% and about 20% of the substrate thickness.

114. A polycarbonate for the use in a storage medium for data wherein the storage medium comprises

a) at least one substrate layer comprising the polycarbonate,

b) at least one data layer on the substrate; and

c) at least one thin film layer on the data layer wherein the thin film layer comprises a material with substantially the same physical properties as the polycarbonate; and

wherein the polycarbonate at a maximum tilt range of 1.2 degrees has a water strain determined by the following equation (II):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta rh.r(11.474\rho^2 - 6.6\rho + 0.99)}$$

wherein t is 1.1 millimeters; ρ is 0.068; r is 53 millimeters; and Δrh is 40% at 25°C.

115. A polycarbonate for the use in a storage medium for data wherein the storage medium comprises

a) at least one substrate layer comprising the polycarbonate,

b) at least one data layer on the substrate; and

c) at least one thin film layer on the data layer wherein the thin film layer comprises a material with substantially the same physical properties as the polycarbonate; and

wherein the polycarbonate at a maximum tilt range of 1.2 degrees has a water strain determined by the following equation (II):

$$\text{Water Strain (\%)} < \frac{\text{Max Radial Tilt Range (degrees)}.t.\pi}{3.46\Delta\text{rh}.r(11.474\rho^2 - 6.6\rho + 0.99)}$$

wherein t is 1.1 millimeters; ρ is 0.091; r is 53 millimeters; and Δrh is 40% at 25°C.